

AMENDMENTS TO THE CLAIMS

Claims 1-40 (Cancelled)

Claim 41 (Currently Amended) A modified animal fiber;

having a surface morphology that is substantially the same as that possessed by the fiber in its un-modified form, the fiber comprising epidermal tissue that exhibits an absorption band for $\text{-SO}_3\text{H}$ group having a relative absorbance of not less than 0.1 and an absorption band for $\text{-S-SO}_3\text{Na}$ group (Bunte salts) having a relative absorbance of not less than 0.08, when measured using reflection FT-IR having an absorption band corresponding to amide I set to 1,

the epidermal tissue having epicuticle layers which afford a water repellency, confirmed by an Allwörden reaction, that is substantially the same as that possessed by the fiber in its un-modified form,

wherein the fiber exhibits shrink proofing of an area shrinkage rate of not more than 8% in a three-hour aqueous washing when measured as a felting shrinkage rate in conformity with Woolmark Test Method 31 and pilling resistance of not lower than third class in JIS L-1076.6.1A method;

said fiber produced by a process which comprises:

a) a first step in which a cystine -S-S- bond in cuticle layers on surface of the fiber is subjected to primary oxidation with an oxidizer having an ability to oxidize the -S-S- bond in the cuticle layers by a pad steam treatment of the fiber with an aqueous solution of oxidizing agent under acidic conditions to contain a state rich in mono-oxidized state,

b) a second step in which the primary-oxidized -S-S- bond is subjected to ~~oxidation with ultrafine bubbles of an ozone/oxygen-mixed gas under acidic conditions~~ an oxidation treatment with ozone being conducted by direct blowing 5 μm or less ultrafine bubbles of an ozone/oxygen-mixed gas to the primary-oxidized animal fibers in an aqueous, acidic treating liquid at a pH of 1.5 to 2.5 and at a temperature of 30 to 50°C, into higher order oxidized states to contain state containing di, tri or tetra-oxidized state ~~and or~~ or a mixture thereof, and

c) a third step in which said -S-S- bond in higher oxidized state is subjected to reductive cleavage.

Claim 42 (Canceled)

Claim 43 (Previously Presented) The animal fiber according to Claim 41, wherein, as a measure of shrink proofing, the value represented by a difference ($\mu_a - \mu_w$) between the coefficient of friction in the tip to root direction (μ_a) and the coefficient of friction in the root to tip direction (μ_w) with respect to a fiber direction, measured in accordance with JIS L-1015 method, is lower by 30% or more in comparison with the difference ($\mu_a - \mu_w$) of unmodified animal fiber in coefficient of static friction or in coefficient of dynamic friction, the value of μ_a being approximately the same as a value in the case of the unmodified animal fiber, and the value of μ_w being higher by 30% or more in comparison with a value in the case of the unmodified animal fiber.

Claim 44 (Previously Presented) The animal fiber according to Claim 41, wherein the animal fiber is one selected from the group consisting of wool, mohair, alpaca, cashmere, llama, vicuna, camel and angora.

Claim 45 (Previously Presented) The animal fiber of Claim 41, wherein the oxidizer is one or a mixture of two or more selected from the group consisting of persulfuric acid, peracetic acid, performic acid, neutral salts and acidic salts of these per-acids, potassium permanganate and hydrogen peroxide.

Claim 46 (Canceled)

Claim 47 (Canceled)

Claim 48 (Previously Presented) The animal fiber of Claim 41, wherein the animal fiber is used as cloth or sliver mainly composed of animal fibers.

Claim 49 (Previously Presented) The animal fiber of Claim 41, wherein the reductive cleavage is carried out using sulfites.

Claim 50 (Previously Presented) The animal fiber of Claim 41, wherein the reductive cleavage is carried out using sodium sulfites or acidic sodium sulfite.

Claim 51 (Previously Presented) The animal fiber of Claim 41, wherein the reductive cleavage is carried out using sodium sulfites.

Claim 52 (Previously Presented). A modified animal fiber;
having a surface morphology that is substantially the same as that possessed by the fiber in its unmodified form, the fiber comprising epidermal tissue that exhibits an absorption band for -SO₃H group having a relative absorbance of not less than 0.1 and by an absorption band for -S-SO₃Na group (Bunte salts) having a relative absorbance of not less than 0.08, when measured using reflection FT-IR having an absorption band corresponding to amide I set to 1,
the epidermal tissue having epicuticle layers which afford a water repellency, confirmed by an Allwörden reaction, that is substantially the same as that possessed by the fiber in its unmodified form,
wherein the fiber exhibits shrink proofing of an area shrinkage rate of not more than 8% in a three-hour aqueous washing when measured as a felting shrinkage rate in conformity with Woolmark Test Method 31 and pilling resistance of not lower than third class in JIS L-1076.6.1A method.

Claim 53 (Canceled)

Claim 54 (Previously Presented) The animal fiber according to Claim 52, wherein, as a measure of shrink proofing, the value represented by a difference ($\mu_a - \mu_w$) between the coefficient of friction in the tip to root direction (μ_a) and the coefficient of friction in the root to tip direction (μ_w) with respect to a fiber direction, measured in accordance with JIS L-1015 method, is lower by 30% or more in comparison with the difference ($\mu_a - \mu_w$) of unmodified animal fiber in coefficient of static friction or in coefficient of dynamic friction, the value of μ_a being approximately the same as a value in the case of the unmodified animal fiber, and the value of μ_w being higher by 30% or more in comparison with a value in the case of the unmodified animal fiber.

Claim 55 (Previously Presented) The animal fiber according to Claim 52, wherein the animal fiber is one selected from the group consisting of wool, mohair, alpaca, cashmere, llama, vicuna, camel and angora.